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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Shin Yasuda

119258

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11/30/2007

OLIFF & BERRIDGE, PLC

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EXAMINER

CHANG, AUDREY Y

ART UNIT

PAPER NUMBER

2872

MAIL DATE

DELIVERY MODE

11/30/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

711

Office Action Summary	Application No.	Applicant(s)	
	10/808,372	YASUDA ET AL.	
	Examiner	Art Unit	
	Audrey Y. Chang	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 September 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-10,12-19,21-31 and 33-42 is/are pending in the application.
- 4a) Of the above claim(s) 1,3-9,19,21-28,30 and 36-40 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10, 12-18, 29, 31, 33-35 and 41-42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>8/30/07</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Remark

- This Office Action is in response to applicant's amendment filed on September 14, 2007, which has been entered into the file.
- By this amendment, the applicant has amended claims 1, 10, 12-13, 19, 28, 29, 30, 31, 34-35, has newly added claims 41 and 42 and has canceled claims 2, 11, 20, and 32.
- **Claims 1, 3-9, 19, 21-28, 30 and 36-40 are withdrawn** from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on March 28, 2007.
- **Claims 10, 12-18, 31, 33-35 and 41-42 remain pending in this application.**

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. **Claims 31, 33-35 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 31 recites "at a position where a maximum point of light beam intensity of a reproduced light beam is shifted by a predetermined amount when each page of the recorded hologram is reproduced". It is not clear where does this "reproduced light beam" come from and it is not clear how could the "reproduced light beam" ever be used **BEFORE** a hologram is recorded.

Claim 31 has also been amended to included the phrase “wherein the recording position where each page of the hologram is newly recorded in a position wherein a light beam intensity of reproduced light beam form page of the hologram previously recorded in the optical recording medium is minimized”. It is not clear and not possible for these two phrases to co-existence.

The applicant is respectfully noted, a reproduced light beam used to read the recorded hologram needed to be at the positions where the light beams used for recorded the hologram. The feature recited in the phrase is therefore impossible for hologram recording and reading.

Claim Objections

3. Claims 13 and 35 are objected to because of the following informalities:

(1). The **amended** phrase “polarization direction of the signal light beam and a polarization direction of the reference light beam ... are orthogonal to each other” recited in claims 13 and 35 is confusing and indefinite. It is not clear if the polarization states are orthogonal at the location of the optical recording medium or not. If so, then no interference pattern or hologram will ever be recorded since the orthogonal polarization states between the reference light beam and the signal light beam will destroy the coherence between the light beams and no interference pattern or hologram will ever be recorded. However, if this phrase is refer to reference light beam and signal light beam before reaching the optical recording medium, then **no optical means** has been provided to ensure that the polarization states are parallel to each other at the recording medium. The scopes of the claims are therefore not clear. **For the examination purpose, this phrase is been interpreted referred to polarization states before reaching the recording medium and not at the recording medium. Clarifications however are required.**

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. **Claims 10, 14, 29 and 31 and newly added claims 41 and 42 are rejected under 35**

U.S.C. 102(b) as being anticipated by the patent issued to Tanaka et al (PN. 6,301,028).

Claims 41 and 42 have been newly added and claims 10 and 31 have been significantly amended that necessitates the new grounds of rejections.

Tanaka et al teaches a *holographic recording apparatus and method* that is comprised of a *laser light beam* (15, Figure 2) for emitting a *coherent* light beam, a *beam splitter* (16) for separating the coherent light beam into a *reference* light beam and a *source* light beam (that will serve as the signal light beam), wherein the reference light beam is deflected by a mirror (17) so that optical paths for the reference light beam and the signal light beam are separated and are led to irradiate a volume holographic memory (10), *serves as the optical recording medium*, at the same time to record the interference pattern between the reference light beam and the signal light beam as hologram. Tanaka et al teaches that a *spatial light modulator* (12) is arranged in the optical path of the source light beam for *modulating* the source light beam in accordance with *recording page data* and therefore *converting* the source light beam into a *signal light beam*, (please see column 5, lines 30-35). The data page information is supplied to the spatial light modulator via an *encoder* (25, Figure 2). Tanaka et al teaches that the *angle* between the reference light beam and the signal light beam can be kept constant, (please see the arrangement explicitly

shown in Figure 2). The volume holographic memory or the optical recording medium are placed on a *driving unit* (19) serves as the *stage* such that the volume holographic memory can be moved *vertically* so that the recording position for each of the hologram recording is *different*, to allow *spatial multiplexing recording* of the holograms for different pages of the data, (please see column 5, lines 7-49, column 6, lines 49-62 and column 7, lines 13-21).

With regard to newly added claims 41 and 42 and amended phrases of claims 10, 29 and 31, (in light of the newly added claims 41 and 42), Tanaka et al teaches that the volume holographic memory (10) is movable or shiftable vertically so that the new hologram for each page of the data supplies by the spatial light modulator is recorded at different spatial locations of the volume holographic memory to perform spatial multiple recording, (please see column 7, lines 2-8). This is known in the art as **spatially multiplexing**. The newly recorded hologram is recorded at a spatially shifted position from the previously recorded hologram, (please see the explicitly demonstration in Figures 6 and 8). The newly recorded hologram is certainly recorded at a **state** where a diffraction light beam intensity from each page of the hologram recorded previously in the memory is minimized, since **firstly** when the newly recorded hologram is recorded the previously recorded holograms are not been reproduced so there is no diffraction light beam from them and **secondly**, since the location of the newly recorded hologram is spatially shifted from the previously recorded holograms even if there is diffraction light beam from previous recorded holograms, the intensity of such diffraction beam at the location of the newly recorded hologram is minimized compared to the diffraction light beam from the newly recorded holograms.

With regard to claim 14, Tanaka et al teaches that the volume holographic memory or the optical recoding medium is comprised of a photorefractive crystal, (please see column 5, lines 46-49).

With regard to claim 31, Tanaka et al teaches that the volume holographic memory or the optical recording medium is moved vertically to achieve *spatial multiplexing recording* of the holograms. This means the page data recorded as the successive holograms are *recorded at different locations*. This

means that if the recorded holograms are reproduced, the locations of maximum light intensity of the reproduced holograms will not be overlapped and will be shifted at a predetermined amount.

This reference has therefore anticipated the claims.

6. Claims 10, 12, 29, 31 and 34 and newly added claims 41 and 42 are rejected under 35 U.S.C. 102(e) as being anticipated by the patent issued to King et al (PN. 6,721,076).

Claims 41 and 42 have been newly added and claims 10 and 31 have been significantly amended that necessitates the new grounds of rejections.

King et al teaches a *system and method for holographic storage* that are comprised of a *laser light source* (110, Figure 1 and 710 in Figure 7), for emitting a *coherent light beam* and a *beam splitter* (115 or 715), for separating the coherent light beam into a *reference light beam* (120 or 720) and an *object light beam* serves as the *signal light beam* (125 or 725). The optical paths for the reference light beam and the object or signal light beam are being separated by the *beam splitter and associated mirrors* such that they propagate to a *holographic storage media*, serves as the *optical recording medium*, (150 or 750) at the same time so that the interference pattern between the reference light beam and the signal light beam is recorded as the hologram. King et al teaches that a *spatial light modulator* (165 or 755) is provided in the optical path of the object or signal light beam to impose a data pattern on the object light beam for recording a *data page* as the hologram. The data pattern is supplied to the spatial light modulator via a *control electronic* (170), (please see column 1, line 53 to column 2, line 6, column 6 line 66 to column 7, line 48). King et al teaches that the holographic storage media (150 or 750) is placed on a *moving assembly* (185), serves as the *stage*, so that the storage media is moved or translated so that the recording positions for each page information is different, to achieve the **shift or spatial multiplexing** recording method, (please see column 10, lines 49-65).

With regard to newly added claims 41 and 42 and amended phrases of claims 10, 29 and 31 (in light of the newly added independent claims 41 and 42), King et al teaches that the storage media is movable or shiftable by a moving assembly (185) so that the new hologram for each page of the data supplies by the spatial light modulator is recorded at different spatial locations of the storage media to perform **spatial multiple recording**, (please see column 10, lines 49-65). This is known in the art as **spatially multiplexing**. The newly recorded hologram is recorded at a spatially shifted position from the previously recorded hologram. The newly recorded hologram is certainly recorded at a **state** where a diffraction light beam intensity from each page of the hologram recorded previously in the storage media is minimized, since **firstly** when the newly recorded hologram is recorded the previously recorded holograms are not been reproduced so there is no diffraction light beam from them and **secondly**, since the location of the newly recorded hologram is spatially shifted from the previously recorded holograms even if there is diffraction light beam from previous recorded holograms, the intensity of such diffraction beam at the location of the newly recorded hologram is minimized compared to the diffraction light beam from the newly recorded holograms.

With regard to claim 31, King et al teaches that the holographic storage media or the optical recording medium is shifted to achieve *spatial or shift multiplexing recording* of the holograms. This means the page data recorded as the successive holograms are *recorded at different locations*. This means that if the recorded holograms are reproduced, the locations of maximum light intensity of the reproduced holograms will not be overlapped and will be shifted by a predetermined amount.

With regard to claims 12 and 34, King et al teaches that the holographic storage media includes a reflective substrate (22, Figure 2A) and a quarter wave plate or polarization shifting layer (24) such that the successive recording of the holograms by using the incident reference light beam and the reflected reference light beam will have the reference light having different polarization state.

This reference has therefore anticipated the claims.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. **Claims 13, 33 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to King et al.**

Claims have been significantly amended that necessitate new grounds of rejections.

The system and method for holographic storage taught by King et al as described for claims 10 and 31 above has met all the limitations of the claims.

With regard to claims 13 and 35, the scopes of the claims are not clear for the reasons stated above. These claims can therefore only be examined in the broadest interpretations. King et al teaches that the holographic storage media or the optical recording medium is structured to have a reflective substrate (22, Figure 2A) and a quarter wave plate (24) associated with it. This means the quarter wave plate will rotate the polarization state of the light beam incident on and reflected back through the reflective substrate by 90 degrees. The polarization state of the **incident** reference light beam (or object light beam) and the **reflected** reference (or object beam) will have orthogonal polarization state. This means the successive recording of the hologram using the reference light beam and the reflected reference light beam can have the polarization state being parallel and orthogonal with respect to the incident object light beam. But since the orthogonal polarization state between the object light beam and the reference light beam will destroy the coherence between the light beams and resulting no hologram record is possible. The polarization state of the object light beam for the second recording (with the reflected reference light

beam) has to be rotated. King et al teaches that the successive recording can be achieved by making the object light beam also reflected through the quarter waveplate, (please see columns 3 and 4). By the same general teachings, it would have been obvious to one skilled in the art to modify the polarization states of the reference light beam and the object light beam to assume any state as long as they have the parallel polarization state as they interfere at the recording medium.

With regard to claim 33, King et al teaches that in the reconstructing phase, the reproduced hologram (or the diffracted light beam from the recorded hologram) is reconstructed by illuminating the medium with a reference beam (320, Figure 3) and the reconstructed hologram light beam is received by the polarization beam splitter (352) with certain polarization state (serves as the analyzer) to allow the reconstructed light beam be detected by a detector, (354). Although this reference teaches a reflected instead of a transmitted signal is being detected, however such modification is considered to be obvious to one skilled in the art since it only requires rearranging part to make the polarization beam splitter transmitting and reflecting different polarization states as shown in the Figure.

9. Claims 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to King et al in view of the patent issued to Hesselink et al (PN. 7,129,006).

The system and the method for holographic storage taught by King et al as described for claim 10 above has met all the limitations of the claims.

King et al teaches that the holographic storage medium is comprised of photopolymer, (please see column 7, line 53), however it does not teach explicitly that the medium is comprised of the materials claimed in the claims. Hesselink et al in the same field of endeavor teaches a variety of materials that are suitable for holographic recording medium. Hesselink et al teaches that photopolymer such as photo-addressable "side-chain" polymers can be suitable for holographic recording medium. This included azobenzene material, (please see column 26, lines 52-60). This material is polarization-sensitive.

Hesselink et al also teaches that *photochromic* material is suitable for holographic recording medium, (please see column 6, lines 44-46). It would then have been obvious to one skilled in the art to apply the teachings of Hesselink et al to modify the holographic storage media of King et al to use the different suitable materials to record the hologram for the benefit of fulfilling different efficiency for different applications required.

Double Patenting

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. **Claims 10, 29 and 31 and newly added claims 41 and 42 are rejected on the ground of nonstatutory obviousness-type double patenting** as being unpatentable over claim 4 of U.S. Patent No. 7,218,597. Although the conflicting claims are not identical, they are not patentably distinct from each other because they both claim a holographic recording for multiple recording a plurality of page. The angle between the reference light beam and the signal light beam is fixed and one of the reference light beam, the object light beam and the optical recording medium is moved to change the recording position. The limitations of recording of hologram at a state when the diffraction light intensity from the previously recorded hologram is minimized is inherently achieved by the spatial multiplexing recording method.

Response to Arguments

12. Applicant's arguments filed on September 14, 2007 have been fully considered but they are not persuasive. The newly submitted claims 41 and 42 and newly amended claims 10 and 31 have been fully considered and rejected for the reasons stated above.

13. In response to applicant's arguments concerning adding the "linking claims 41 and 42" that necessitates the rejoining of the previously restricted claimed species the examiner respectfully disagrees for the reasons stated above. Even by adding the linking claims the claimed **are still restricted as exclusive species** as explicitly stated in the previous Office Actions that they cannot be rejoined.

Particularly, **claims 36-40 are** directed to an invention that is **independent** or distinct from the invention **originally claimed** and **newly submitted claims 41-42** for the following reasons: claims 36-40 are drawn to **rewriting** a second hologram on which a first hologram is recorded, (rewriting means writing the same information a second time). This is **mutually exclusive** from the elected species (B, referred to restriction requirement dated February 28, 2007), concerning writing *different* pages of information (i.e. different hologram and not a rewritten hologram) at *different* spatial position of the holographic recording medium. And it is different from multiple recording of a plurality of pages of information in the recording medium. Claims 36-40 therefore is distinct from claims 41 and 42 and elected species B.

14. In response to applicant's arguments concerning the cited Tanaka and King references with respect to the newly added features, they have been fully responded in the reasons for rejection stated above. The applicant is respectfully noted that both Tanaka and King references teach spatial multiplexing recording method that by definition and disclosure that the recording location for each page data is spatially different and the hologram is recorded when the previously recorded holograms are not being reproduced, i.e. at a state that the diffraction light intensity is at minimum. Also since the locations of the holograms for the data pages are spatially different, the reproduced holograms would also at spatially different locations and the intensity for each diffraction light beam from each hologram is

therefore minimized at the positions other than the recording location of the hologram. These references therefore read on the claims. The newly amended phrase "the recording position ... is a position where light beam intensity of the reproduced light beam from each page of the hologram previously recorded ... is minimized" in amended claims 10, 29 and 31 is being interpreted in light of the newly added independent claims 41 and 42 wherein the hologram is newly recorded in state where a diffraction light from each page of a hologram previously recorded is minimized, (newly added claims 41 and 42), wherein the state is when the previously recorded holograms are not being reproduced.

Conclusion

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

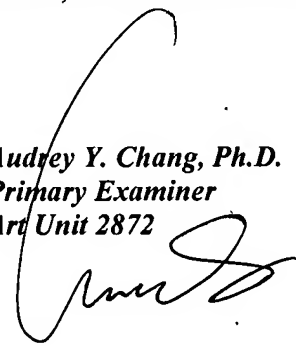
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephone B. Allen can be reached on 571-272-2434. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Audrey Y. Chang, Ph.D.
Primary Examiner
Art Unit 2872



A. Chang, Ph.D.